REMARKS

The final rejection of the pending claims is in error. In the Examiner's rejection the claims under § 103(a) as being obvious from da Costa in view of Chinn, the Examiner has used improper hindsight to cherry pick the teachings of da Costa and Chinn in order to find the elements of the claims. Specifically, the Examiner states:

> Chinn et al discloses an actuator, which may be used as a pump (col. 2 line 2) and includes an electro-actuated polymer gel housed in a non-conductive housing. The gel 10 is encased in a housing 20 which is chemically inert, the gel is encased within the housing by a member 24 which is semi-permeable to the electrolyte. This structure is also encased with a sealed conformal coating. Note especially the disclosure from col. 5 line 55 to col. 6 line 36. At the time of the invention it would have been obvious to one of ordinary skill in the art to substitute the plural actuators such as taught by Chinn et al for the actuators of da Costa since such an substitution would result in a miniature fluid device that is actuated with low electrical potentials and has significant performance characteristics (see col. 1 lines 30-35 and col. 2 lines 17-28). Final Rejection dated July 1, 2009 at p. 3

The Examiner misconstrues the teachings of da Costa and Chinn et al. in order to substitute the actuators as taught by Chinn et al. for the actuators of da Costa. Da Costa describes a "hermetic compressor to be used in refrigeration systems, such as refrigerators, freezers, air conditions and others which **require high pressure pumping**." Abstract (emphasis added).

High pressure changes and volume of fluid displaced are required in refrigeration compressors to allow the temperature change of the refrigeration fluid that drives the cooling action of the refrigerator. In compressor refrigeration units, a refrigerant gas (at or slightly above the temperature of the refrigerator volume) is compressed in a compressor. The pressure change in the compressor heats the gas and causes the refrigerant to condense into a liquid. When the high pressure condensed refrigerant is discharged from the compressor the refrigerant expands and evaporates. The cooling of the expanding and evaporating refrigerant is used to cool the refrigerated volume. Because condensation occurs at lower pressures when the gas is

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at a lower initial temperature, the pressure needed to condense the refrigerant is lowest at extremely low temperatures. *See* US 2007/0068181 ¶¶ 1-15 (describing known refrigerator systems, filed Oct. 29, 2003)

While no specific pressure is taught by da Costa, U.S. patent no. 4,515,534 to Lawless et al. ("Lawless"), cited during prosecution of da Costa describes a miniature solid state gas compressor with a 25 atm (2,532.5 kpa) outlet pressure as typical for use in refrigeration. col. 11, lines 6-25. Lawless further describes flow rates of 261 mg/sec of air operating at 1khz or one thousand pulses of the pump per second. *See* col. 10, lines 7-40. Moreover, U.S. Patent No. 7,207,191 to Zhu et al. (filed Mar. 29, 2004) describes pressures typical in a cryogenic refrigerator stating, "depending on the refrigerant, the pressure may be ranged from 0.1 Mpa – 1000 Mpa" (100 – 1,000,000 kpa). Col. 6, line 66-col. 7, line 3. Thus, even at extremely low temperatures (2-30 degrees K), the pressure required by a refrigeration compressor is at an absolute minimum 100 kpa.

In contrast, the actuators of Chinn "display a 90 second lag time before the specimen begins to swell axially" and reach a maximum pressure of about 14 kPa after about 20 minutes of oxidation. Col. 4, lines 11-37 and Fig. 2. An arrangement of the structure of Chinn in series in place of the actuators of da Costa, as suggested by the Examiner, would take several hours to perform a single stroke reaching a pressure less than $1/100^{th}$ of the pressures typically used in refrigeration compressors and a fraction of the minimum required even at extremely cold temperatures. Such limited compression capability over such a long period of time would be completely incapable of cooling even minute volumes in the refrigeration context.

Additionally, the times and pressures reflected in Chinn take place at temperatures between 19-22°C (approximately room temperature). See Fig. 2. One having skill in the art

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would expect even lower pressure exerted due to slower uptake of solvent and ions, and even freezing of the solvent and actuator gel, at the lower temperatures required in refrigeration.

In short, replacing the actuators of da Costa with the actuators of Chinn would make the invention of da Costa completely inoperable for its intended purpose. It is well established that "an inoperable invention or one which fails to achieve its intended result does not negative novelty." *U.S. v. Adams*, 383 U.S. 39, 50, (1966) (citing *Smith v. Snow*, 294 U.S. 1, 17 (1935). The Examiner provides no rationale by which Chinn might be otherwise modified to achieve the claimed invention. Accordingly, because one having skill in the art would have no expectation of success in combining the teachings of Chinn and da Costa, the rejection under 35 U.S.C. § 103 (a) is improper and must be withdrawn.

The foregoing Amendment makes no claim changes and should be entered as a matter of right.

Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance. Entry of the foregoing Amendment and allowance of the Application are respectfully requested.

In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account Number 08-1391

Respectfully submitted,

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By: